RHODE ISLAND COASTAL WETLANDS INVENTORY

PRESENTED BY

VALERIE CAPPOLA
SAJI VARGHESE

NEW ENGLAND DISTRICT

US Army Corps of Engineers®
New England District

OBJECTIVE

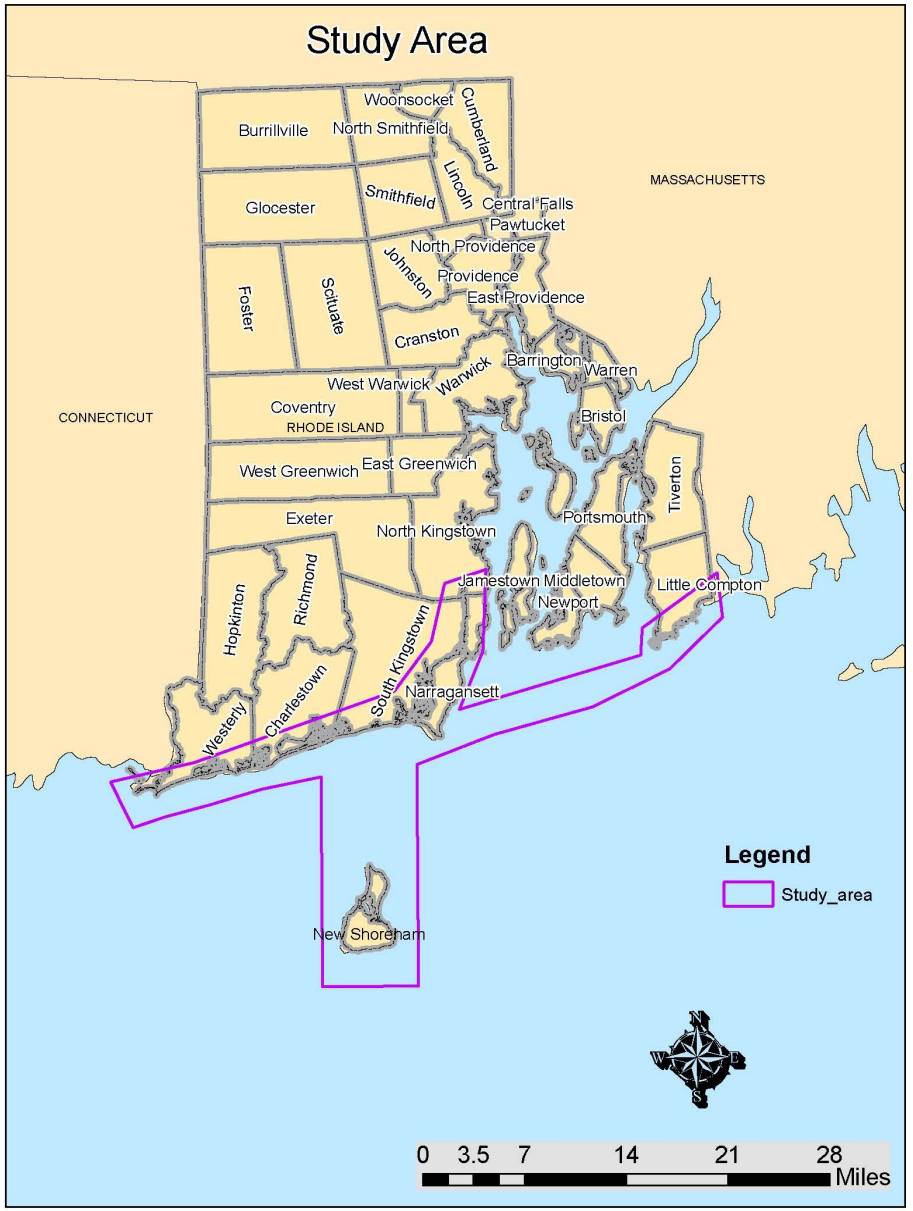
- To develop an accurate wetland mapping for coastal Rhode Island using Geographical Information Systems (GIS), inventorying those coastal wetlands and identifying site specific and external impacts based on current and historical aerial photographs.

AUTHORITY

- This study was conducted under the Planning Assistance to States (PAS) program.

PROBLEM IDENTIFICATION

- Rhode Island has about 384 miles of shoreline. Approx. 111 miles of shoreline in this study.



PROBLEM IDENTIFICATION

- The coastline of Rhode Island has a series of coastal lagoons called salt ponds lying behind narrow barrier beaches.

- Historically, temporary breach-ways used to be dredged from the ocean into these larger ponds to accommodate large boats for trading.

PROBLEM IDENTIFICATION

- In 1950s permanent breach-ways were constructed in some of the ponds.
- The increase in salinity caused by uninterrupted flow of seawater changed the habitat of the ponds and the surrounding wetlands.
- Since mid-1980's, increases in population, commercial development, and tourist related activities have also impacted the ponds and the surrounding wetlands.

METHODOLOGY

- Aerial photos from 1999 (scale 1:12,000). Ortho-photos from 2003 (scale 1:5,000).
- ArcGIS 9.2 – GIS software. MS Access – database.
- Wetlands evaluated within a 500-foot buffer from coastline
- Wetlands and deepwater habitats were classified according to Cowardin standards.
- Coastal wetlands include marine and estuarine intertidal wetlands.

Table 1: Classification, Tidal regimes and Special Modifiers used for Habitat Types (from Huber, 2003)

Habitat Classification
Subtidal Intertidal Tidal Regimes Subtidal (L) Irregularly exposed (M) Regularly Flooded (N) Irregularly Flooded (P)
Special Modifiers Excavated (x) Impounded (h) /Diked (h) Ditched/Partly Drained (d) Artificial (r) Oligohaline (6)

Examples of NWI Classification Codes and Descriptions

NWI Code and Modifier	Cowardin et al. (1979) Description	Common description	Examples of Vegetation or Cover
E1UB, M1UB (L, Lh, Lx)	Estuarine, Marine Subtidal, Unconsolidated Bottom	Estuarine, or Marine Open Water	Open Water (open ocean, lagoons & tidal creeks)
E1AB3L; M1AB3L	Estuarine or Marine, Subtidal, Rooted Vascular Aquatic Bed	Eelgrass Beds	*Zostera marina*
E1AB1L	Estuarine, Subtidal Algal, Aquatic Bed	Algal Beds	*Ulva lactuca*, *Fucus* spp. *Chondrus crispus*,
E2US4 (N, M)	Estuarine, Intertidal Unconsolidated Bottom Organic	Pannes	*Salicornia* sp.
E2US (1,2,3) (M,N)	Estuarine, Intertidal Unconsolidated Shores	Tidal Flats	Cobble, gravel, sand or mud; patches or algae
E2EM(1,5*) P	Estuarine, Intertidal Persistent Emergents, Irregularly Flooded	High Marsh	*Spartina patens*, *Juncus gerdii*, *Distchlis spicata* (*5= *Phragmites australis*)
E2SS1P	Estuarine, Intertidal Scrub-Shrub, Broad-Leaved Deciduous, Irregularly Flooded	High Marsh	*Iva frutescens*, *Baccharis halmifolia*
E2EMIN	Estuarine, Intertidal Persistent Emergents, Regularly Flooded	Low marsh	*Spartina alterniflora*
E2EM(1,5*)P6	Estuarine, intertidal Persistent Emergents Irregularly Flooded, Oligohaline	Brackish Marsh	*Typha angustifolia*, *Sartina pectinata* (*5 = *Phragmites australis*)

METHODOLOGY (Contd..)

- Potential estuarine wetland restoration sites were assigned to specific categories within two broad types used by Tiner *et al*. (2003):

- **Type 1** - former estuarine wetlands (sites for increasing estuarine wetland acreage) and
- **Type 2** - degraded estuarine wetlands (existing coastal wetlands whose functions may be improved through restoration).

Type 2 sites were subdivided

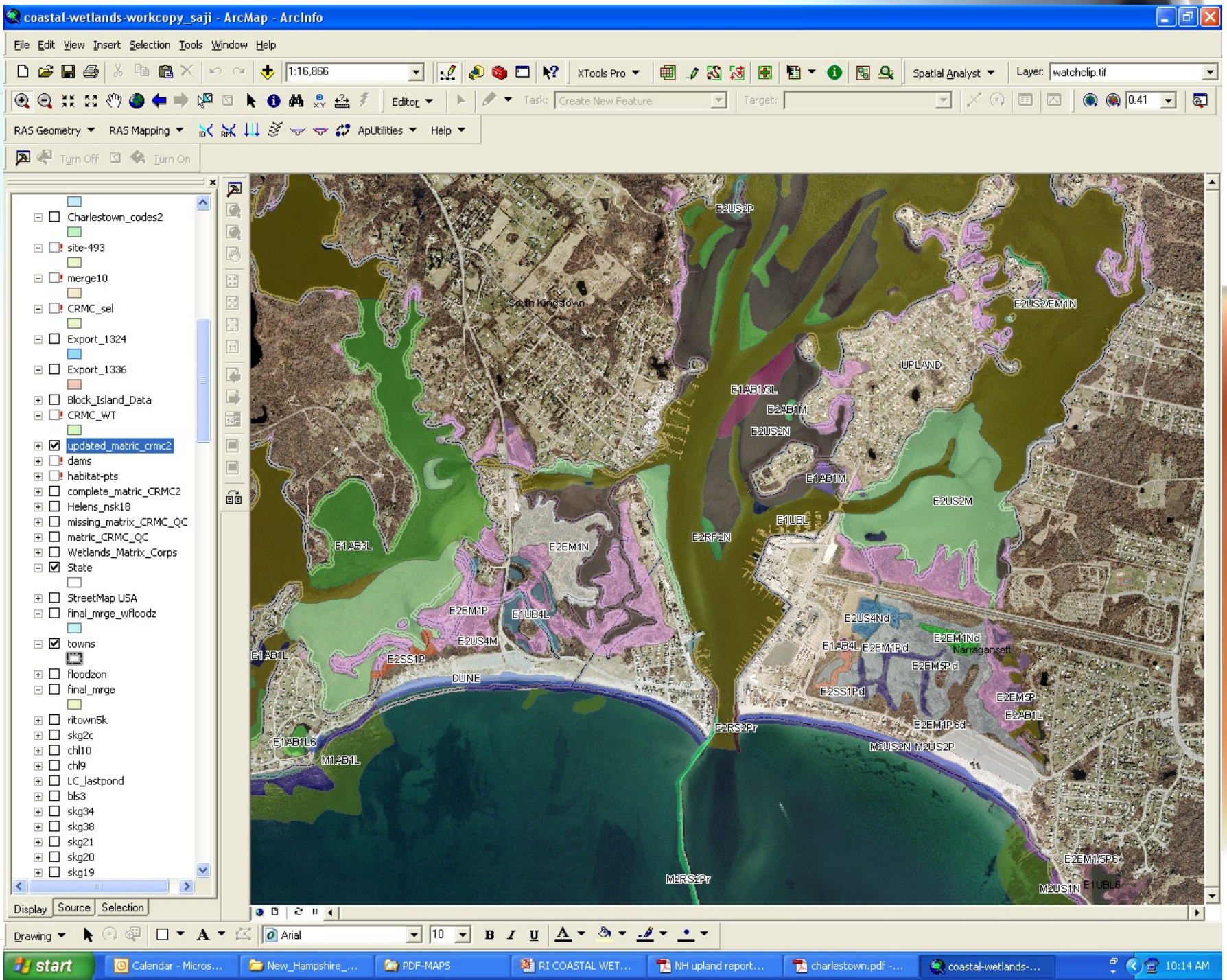
(1) sites with internal alterations

(e.g., tidal restrictions, ditches, dikes, excavation, vegetation changes, and minor filling)

(2) estuarine wetland that may be threatened by off-site activities.

Potential estuarine wetland restoration site types and coding used for the Coastal Rhode Island wetlands

Code	Impact Type
1w	Palustrine Wetland (former estuarine wetland)
1x	Excavated or Impounded Fresh Waterbody (former estuarine wetland)
2r	Tidally Restricted
2rs	Severely Tidally Restricted
2d	Significantly Ditched
2h	Diked/Impounded
2f	Minor Filling
2fs	Minor Filling/Dredge Spoil
2v	Vegetation Change (also includes Phragmites-dominated estuarine wetlands)
2vi	Vegetation Change/Iva
2x	Excavated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site-493
merge10
CRMC_sel
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skg21
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skg19
Display
Source
Selection
South Kingstown
E2US2P
E2US2/EM1N
UPLAND
E1AB1/3L
E2AB1M
E2US2N
E1AB1M
E2US2M
E1UBL
E2RF2N
E1AB3L
E2EM1N
E2EM1P
E1UB4L
E2US4M
E1AB1L
E2SS1P
DUNE
E2US4Nd
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Narragansett
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E2EM5P
E2AB1L
E2EM1P5d
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M1AB1L
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METHODOLOGY (Contd..)

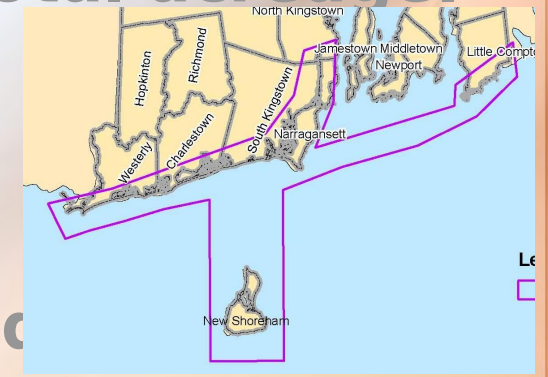
- Potential restoration sites were identified by creating wetland complexes.
- The individual wetland polygons were grouped into potential restoration project areas or complexes based on their location, type of impairment, ecology, field conditions, and other variables.
- All potential restoration sites within one complex have the same complex code.

METHODOLOGY (Contd..)

- CRMC conducted field verification studies.
  - for areas within a restoration complex they determined if the site was coded correctly from the aerial photo interpretation, and noted any changes that may have occurred since these photos were taken.
- Once the data was rectified, then the wetlands with potential for restoration were identified.
- Corps personnel then completed ground truthing of potential restoration sites and collected real estate information for each of the identified wetlands.

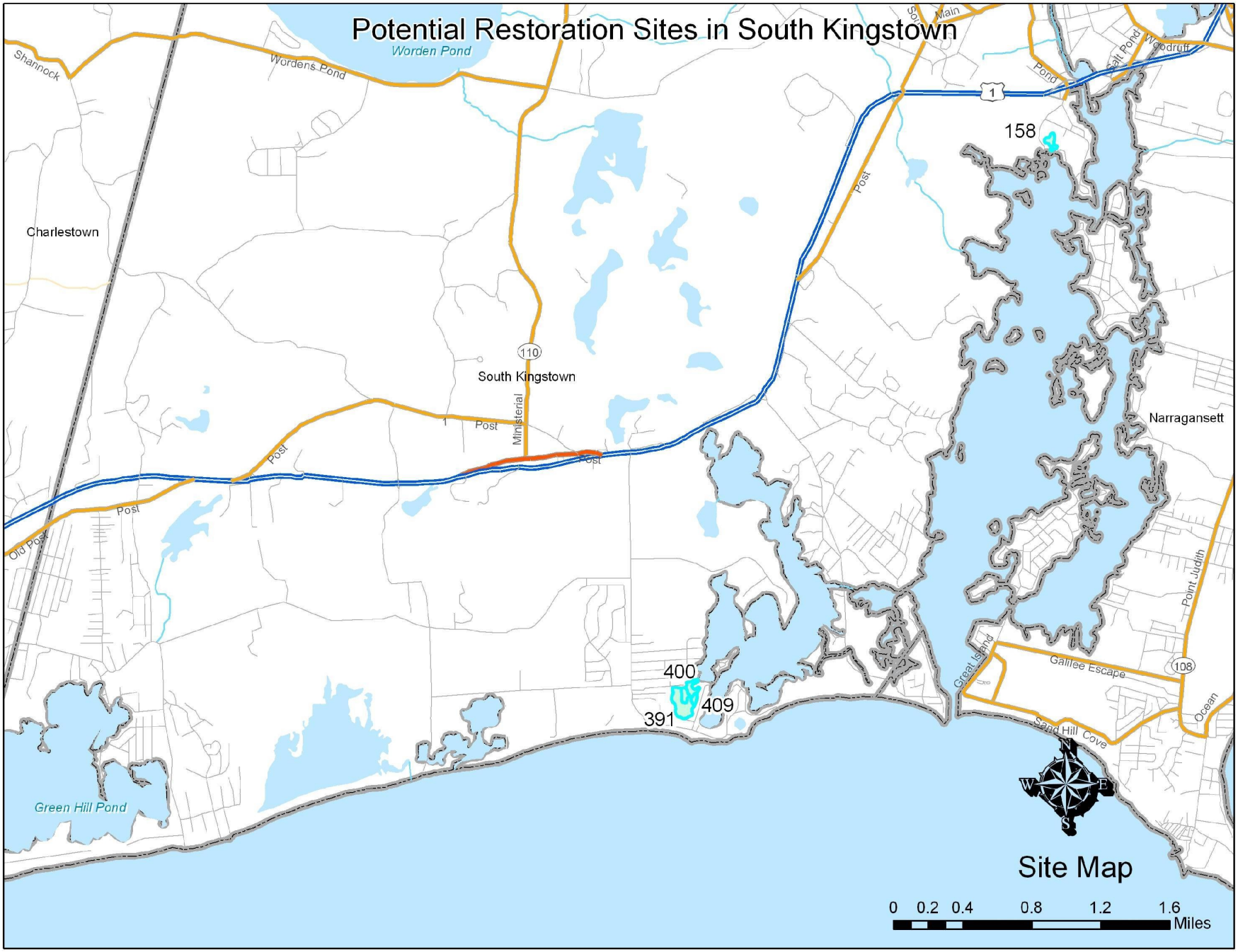
RESULTS

- Approximately 13,052 acres of marine and estuarine wetland and habitats were mapped for coastal Rhode Island.
- Estuarine environments account for about 85 % (11,045 acres) of the total acreage.
- Ocean habitat was not included except for near shore areas with aquatic bed
- Irregularly flooded emergent wetlands dominate the tidal marshes, representing approximately 99% (1,325 acres) of these vegetated wetlands.



Results (Contd..)

- *Phragmites australis* (common reed) occurs in 555 acres and is the dominant species in at least 289 acres.
- Scrub shrub wetlands only account for approximately 12 % of the vegetated wetlands (159.3 acres).
- The project identified 152 restoration complexes.
- 9 sites with potential for restoration were identified.


Potential Restoration Sites in South Kingstown
Worden Pond
Shannock
Wordens Pond
Charlestown
South Kingstown
110
Ministerial
Post
Old Post
Main
Pond
Salt Pond
Woodruff
1
158
Narragansett
Point Judith
Great Island
Galilee Escape
108
Ocean
Sand Hill Cove
400
409
391
Green Hill Pond
N
W
E
S
Site Map
0 0.2 0.4 0.8 1.2 1.6
Miles

Sites 391, 400 and 409
N
W
E
S
400
409
391
0
210
420
840
Feet

Site 391-400-409

Key Takeaway Points

- **The advances in GIS software has made projects such as wetland mapping for the entire coastline of a state feasible.**
- **Of the 152 potential restoration sites identified by this study, the state only found 9 sites with restoration potential.**
  - **The data for other sites that were identified as potential restoration sites are now available and these sites can be revisited anytime in the future.**
- **Although the aerials used were from 1999 they still provided a fairly accurate picture of the habitat.**
  - **Site visits showed an increase in *Phragmites* in some areas but overall very few changes to the habitat codes were made for the polygons visited.**